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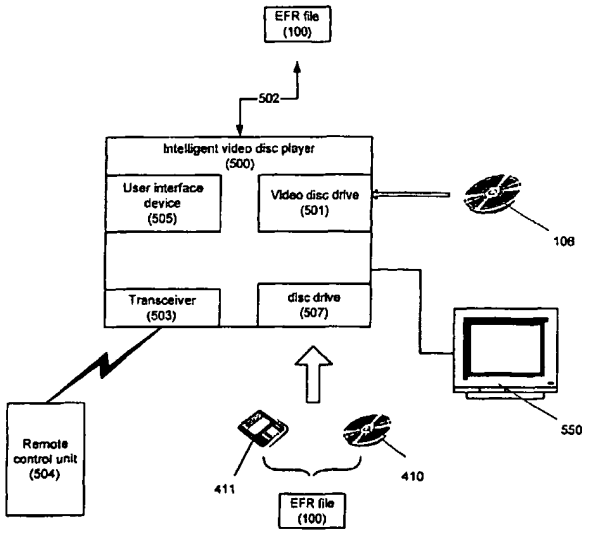
(54) Title: METHOD AND SYSTEM FOR CONTROLLING AND ENHANCING THE PLAYBACK OF RECORDED AUDIO-VISUAL PROGRAMMING



(57) Abstract: A system for controlling playback of a video program recorded on an optical disc or other recording medium uses an electronic data file (100) that is independent of, but corresponds to, the video program recorded on the recording medium (106). The electronic data file provides a hierarchical segmentation of the video program and associates supplemental information with various segments of the video program. Consequently, the user can access the supplemental information to learn more about that segment of the video program or screen that segment for potentially objectionable content. The user may also edit the playlist of segments in the electronic data file to control the playback of the video program.

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TITLE OF THE INVENTION

Method and System for Controlling and Enhancing the Playback of Recorded Audiovisual Programming

FIELD OF THE INVENTION

The present invention relates to the field of video recording and playback. More specifically, the present invention relates to the field of prepared video productions for educational and entertainment use. The present invention encompasses a novel software package for controlling and enhancing the playback of a pre-recorded video program, where the software package allows the viewer to edit the playback of the video program for selected content, access supplemental information about the program content and monitor the effect of the editing decisions on the playback of the program.

BACKGROUND OF THE INVENTION

Television and cinema provide a vast array of available video programming. By watching a television broadcast or attending a film showing, a viewer can experience almost any type of video programming he or she desires. Additionally, in order to make such video programming even more accessible to viewers, such video programming may be recorded on such media as video cassettes or optical discs for playback using an appropriate recording and playback device at the viewer's convenience.

Being able to play back a recorded video program also provides the viewer with greater control over how that video program is viewed. For example, if a viewer wishes to replay a portion of the video program, he or she may do so using the playback device. Similarly, if the viewer wishes to skip over a portion of the video program he or she may fast forward through the program using the playback device.

If the video programming is on an optical disc, such as a CD-ROM, laser disc or Digital Video(Versatile) Disc ("DVD"), the reader of the playback device can quickly access any portion of the video program. If the optical disc playback device is incorporated into a computer, for example, and controlled by the computer, the user may specify what portions of the video program and in what order those portions should be played by the playback device.

For example, U.S. Patent No. 5,109,482 to Bohrman discloses a video playback and control system in which the viewer may access all the frames in a recorded video program, and specify segments of the program by a starting and ending video frame such that only those segments specified by the viewer are replayed. Moreover, the viewer may indicate the order in which segments are to be replayed and associate with each segment textual comments relating to the segment.

Similarly, U.S. Patent No. 5,434,678 to Abecassis discloses a system for controlling the playback of a video program in which segments of the program are specified and rated as to potentially objectionable subject matter they contain. Using a computer or other user interface device for controlling playback under the principles of the Abecassis system, the user specifies a rating for categories of potentially objectionable subject matter above which the viewer does not wish to see rated material. The video program, as recorded, contains alternative sequences and video segments which have various ratings of potentially objectionable content contained therein. The playback device will then automatically select and substitute those segments of the video program which match the preferences established by the user for objectionable content in the replay of the video program.

While systems such as those disclosed by Bohrman and Abecassis provide viewers with a great deal of control over the playback and content of a recorded video program, they fail to allow the viewer to monitor the impact such editing has

on the video program. Consequently, there is a need in the art for an improved video playback control system which allows the viewer great flexibility in controlling potentially objectionable content in a video program, but also allows the viewer to monitor the impact any editing has on the video program.

Additionally, the prior art systems generally require that any supplemental information or commentary regarding the various scenes of the video program be input by the user or recorded on the same medium as the video program. Consequently, there is a need in the art for a more flexible way of providing a user with supplemental information about the segments and segment content of a recorded video program, particularly where no such information was originally included on the same recording medium as the video program.

In connection with these aspects of the art, the prior art systems present the recorded video program and any divisions thereof in a flat, linear list. Consequently, there is a need in the art for a method and system of better organizing a structure associated with a recorded video program to permit more rapid and easy navigation by the user among the segments of the program and any information associated therewith.

Other systems related to the use of video programming have addressed the desire of viewers to edit out objectionable content. One such device is a program for dynamically editing the content of a video program which is broadcast to the viewer's television set. In these systems, a signal which indicates the presence potentially objectionable subject matter in each segment of the broadcast program is included in the broadcast signal in a field which is also used for carrying close-captioned text for the video program. The system then monitors this signal from the close-captioning field and compares the objectionable nature of the program as indicated by the incoming signal with a preset preference provided by the user that defines a rating above which programming content should be avoided. When the signal from the closed-captioning field of the video broadcast signal

indicates material in conflict with the preference setting provided by the user, the system may appropriately mute the audio or blank the video output to remove the objectionable content from the video program.

This system, unfortunately, only works if the appropriate rating information is provided in the closed-captioning portion of the video programming signal. If this is not the case the system will have no ability to edit the programming according to the desires of the user. Moreover, this system must simply divide potentially objectionable subject matter into relatively broad categories which can then be selected or refused by the user. The user has very little control to precisely define what he or she may consider objectionable and remove only that material from the video program. Finally, the use of video rating information in the closed-captioning portion of the video signal requires additional processing of the signal by the receiver and playback equipment and prevents the full use of that portion of the signal for closed-captioning or other information that may be carried there.

Consequently, there is a need in the art for an improved method and system of allowing a user to remove those scenes or audio portions of a video program which that user finds objectionable. There is a further need in the art for such a system to allow the user great flexibility in determining precisely that subject matter which he or she finds objectionable and removing only that subject matter from the video program.

SUMMARY OF THE INVENTION

The present invention meets the above-described needs and others. Additional advantages and novel features of the invention will be set forth in the description which follows or may be learned by those skilled in the art through reading these materials or practicing the invention. The advantages of the invention may be achieved through the means recited in the attached claims.

In summary, the present invention may be embodied and described as a novel video playback system for playing back a video program recorded on an optical disc or other recording medium. This system includes a video playback device connected to a reader for reading the video program stored on the recording medium, the reader being controlled by the video playback device. The video playback device controls playback of the video program in accordance with a user-editable electronic data file existing in the video playback device independent of data recorded on the recording medium.

The electronic data file includes a user-editable playlist that specifies a division of the segments of the video program as recorded on the recording medium. The electronic data file preferably also includes supplemental information associated with the specified segments of the video program.

The video playback device also preferably includes a user interface including a display device on which the playlist is displayed. The displayed playlist provides a listing of the segments of the video program and may also provide a coding system that indicates what types of the supplemental information are associated with each segment. The playback device can then access and display the supplemental information under control of a user operating the user interface.

Using the user interface, the user can also make changes to the playlist. The playback device records the changes to the playlist made by the user through the user interface. Thus, the electronic data file may include an original and an edited playlist.

The electronic data file may also provide a description of each of a number of audio segments of the video program. The user can edit the playlist to remove any of the audio segments from the playlist so that the removed audio segment is omitted from a playback of the video program. The playback device also records

such deletions of audio segments from the playlist in the edited playlist of the electronic data file.

The system may also preferably generate a statistical analysis of characteristics of the video program as played back in accordance with the edited playlist. This analysis may be conducted directly on the edited playlist or in comparison with an unedited version of the playlist. This analysis will provide such data as the running time of the edited program, damage to the plot of the program arising from the editing and types of supplemental information associated with remaining video segments.

The present invention also encompasses the methods of making and operating the system described above and the method of generating the electronic data file described above. For example, the present invention encompasses the method of controlling and enhancing playback of a video program recorded on an optical disc or other recording medium by controlling playback of the video program with a video playback device in accordance with a user-editable electronic data file existing in the video playback device independent of data recorded on the recording medium.

The present invention also encompasses the method of providing an electronic data file for use in controlling playback of a corresponding video program recorded on an optical disc or other recording medium. This method includes dividing the video program as recorded on the recording medium into a hierarchy of segments; and storing the hierarchy in an electronic data file independent of data recorded on the recording medium. This method, consistent with the description above, may also include the addition of supplemental information stored in the electronic data file and associated with various video segments.

The present invention also encompasses a method of doing business in which customers are provided with a means for controlling and supplementing

playback of a video program recorded on a recording medium. This method includes selling an electronic data file that corresponds to the video program on the recording medium, where the electronic data file includes a user-editable playlist that divides the video program into video segments and includes supplemental information associated with one or more of the video segments. This data file, as described above, is usable to control playback of the video program on a video playback device.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate the present invention and are a part of the specification. Together with the following description, the drawings demonstrate and explain the principles of the present invention.

Fig. 1 is diagram of a system according to the present invention for producing a multi-platform file that supplements and facilitates editing of a pre-recorded video program.

Fig. 2 is a flowchart illustrating the operation of the software of the system of Fig. 1.

Fig. 3 is a diagram of the content of a pre-recorded video program and the hierarchical structure of that content according to the multi-platform file of the present invention.

Fig. 3a is a diagram of a second division of the content of a pre-recorded video program and the hierarchical structure of that content according to the multi-platform file of the present invention.

Fig. 4 is a diagram of a video program playback system according to the present invention.

Fig. 5 is a diagram of a second embodiment of a video program playback system according to the present invention.

Fig. 6 is an illustration of the editing system, multi-platform file and playback devices of the present invention.

Fig. 7 is a flowchart illustrating the operation of the software of the playback system of Figs. 4-6 according to the present invention.

Fig. 7a is an illustration of a hierarchical tree of the playlist of the present invention.

Fig. 8 is a diagram of additional divisions of the content of the pre-recorded video program for supporting the audio editing features of the present invention.

Fig. 9 is a flowchart illustrating an additional analysis feature of the software of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention provides a method and system for controlling and enhancing the playback of recorded audiovisual programming. More specifically, the present invention provides systems for generating and using an electronic data file that divides the recorded audiovisual program into segments and provides supplemental information about the various segments of the program. This electronic data file can be used by a number of different playback platforms and allows the user to easily edit the playback of the program for appropriate content and access supplemental information about program segments.

Fig. 1 illustrates a system according to the present invention for generating the multi-platform data file that corresponds to and supplements a recorded video program. This file is referred to herein as an Electronic Film Review or "EFR" file.

As shown in Fig. 1, the system of the present invention for generating an EFR (100) preferably includes a computer (108) with an optical disc drive (107). As will be understood by those skilled in the art, the principles of the present invention can be applied to recorded video programming that is recorded on, for

example, a CD-ROM, a laser disc or a Digital Video(or Versatile) Disc ("DVD"). The term "optical disc" will be used to refer generally to these and any equivalent video storage media.

The invention may also be applied to a recorded video program stored on other data storage media including, but not limited to, a magnetic disc, a magneto-optical disc, or semiconductor memory. The term "recording medium" will be used herein to refer to all such recording media on which a video program can be recorded, including, but not limited to, optical discs, magnetic and magneto-optical discs, and semiconductor memory unit.

The computer (108) preferably includes a modem and connection (102) to the Internet or World Wide Web (101). Consequently, the EFR may be sold and distributed over the Internet (101).

The computer (108) also has a monitor (103) on which the video program, recorded on the optical disc (106) and retrieved by the optical disc drive (107), is shown. With user input devices, such as the keyboard (104) and mouse (105), a user can divide the recorded video programming into a hierarchy of segments. Additional data can then be associated with each segment which supplements the segment, describes the segment or identifies potentially objectionable subject matter in the segment. As used herein, a "segment" refers to any specified portion of the recorded video program at any hierarchical level, including the entire video program.

The divisions of the video programming into segments and the additional information associated with each segment are written to an EFR file (100) which exists independently of the programming recorded on the disc (106). The EFR file (100) is preferably written in a multi-platform markup language, such as Extensible Markup Language (XML) using Unicode to encode the characters.

The creation of the EFR (100) is done using a video software package running on the computer (108). Fig. 2 is a flowchart of this software package and

illustrates the method of creating an EFR (100) under the principles of the present invention.

As shown in Fig. 2, the optical disc drive, under control of the video software package, reads the data for the video program from the optical disc (201). The program, under control of the user, is then displayed on the monitor of the computer. The video program consists of a series of frames, still images, that are displayed in rapid succession to give the illusion of motion. The user can specify a video segment by indicating a starting frame and an ending frame. Each frame may be numbered to facilitate selection and identification by a user who is defining video segments.

As the user defines video segments (203), the segment parameters, i.e., an identification of the frames that begin, end and are included in the segment are written to the EFR file (204). After a segment is identified, the user may provide additional data associated with any of the segments (205). This information may be background or critical information about the film or the particular segment, cultural or linguistic information about the segment, a synopsis of the segment, an identification of potentially objectionable content in the segment, a rating of the importance of the segment to the plot of the program, etc. Any information the user wishes to associate with that segment may be input (205), including numeric values or alphanumeric codes that characterize aspects of the segment. The user may also designate various types or categories of such additional information. This additional data is then written to the EFR (100). All such information, whether graphic, textual, animated, etc., is referred to herein as "supplemental information."

This process continues until the user has finished (207), i.e., has defined all the video segments desired and entered all the desired supplemental information. When the process is finished, the software completes the EFR file (208), which

includes the divisions of the video programming and all the supplemental data provided by the user.

Fig. 3 illustrates in more detail the hierarchical division of the video program written to the EFR (100). The example illustrated in Fig. 3 is that of a DVD (320). When manufactured, the DVD (320) already includes some division of the recorded programming into various segments. As shown in Fig. 3, the material on a DVD is generally divided into a preview section (302), a main segment consisting of the video program (301) and a trailer segment (303) which may include out-takes from the video program, director's notes or comments, behind the scenes footage, explanations of how the film was made, etc. The video program's main segment (301) is usually divided in to a number of chapters (304). Consequently, when a user plays a commercial DVD, he or she can choose to watch a preview, a trailer or the main program and, within the main program (301), can select a particular chapter (304) at which to start watching. Thus, box (330) indicates the hierarchical structure provided on a conventional DVD.

Box (331), however, illustrates additional hierarchical structure and divisions of the main program (301) provided in the EFR (100) of the present invention. Each of these segments is preferably defined by identifying a first and last frame for that segment. The hierarchical structure is for the convenience of the user in navigating through the defined segments of the program (301). As shown in Box (331), each chapter (304) is divided into a number of scenes (305). Each scene (305) is divided into a number of sub-scene segments (306). Finally, each sub-scene (306) is divided into a number of clips (307). As used herein, the term "clips" refers generally to segments of the video program at the bottom level of the hierarchy illustrated in Fig. 3. The divisions between the preview (302), main segment (301) and trailer (303), and between the chapters (304) in the main segment (301) may also be written into the EFR (100).

The user may choose to provide supplemental information for any segment (304-307) at any hierarchical level in the system (331). However, information supplementing each clip (307) is preferred and gives the user the most detailed information and control over the video program (301).

Fig. 3a illustrates a second embodiment of the hierarchical structure of the segmentation of the video program. According to the principles of the present invention, there may be more than one hierarchical structure dividing a recorded video program, with all alternate hierarchical structures being stored in the EFR (100). As shown in Fig. 3a, a chapter (304) may have a first hierarchical structure of segments (331) as illustrated and described in Fig. 3. The same chapter (304) may also have a second hierarchical structure of segments (331a) that divides the chapter in a different way.

One segmentation scheme (e.g., 331) may be best suited to editing the video program for presentation in an educational context. The alternative segmentation scheme (e.g., 331a) may be best suited to editing the video program for entertainment use. Consequently, two or more alternate segment hierarchies may be produced and include in the EFR (100) of the present invention.

Fig. 4 illustrates a system according to the present invention for using an EFR (100) to support and control the playback of the corresponding video programming. The exemplary system of Fig. 4 includes a computer (408) which includes an optical disc drive (107), e.g., a DVD drive, for playing back video programming recorded on an optical disc (106), e.g., a DVD. The video programming from the disc (106) is displayed on a monitor (403) of the computer (408). As will be understood by those skilled in the art, the computer (408) may be, for example, a desk-top computer, a lap-top computer, a server or other computer system. The computer (408) is controlled through its user interface, e.g., the keyboard (104), mouse (105) and display (103).

Under the principles of the present invention, the user of the optical disc (106) will also want to acquire an EFR file (100) that corresponds to the programming on the optical disc (106), i.e., the EFR (100) delineates a hierarchical structure of segments of the video program on the disc (106), such as that shown in Fig. 3, and provides supplemental information about various segments of the video program recorded on that disc. As will be described in detail below, a video playback software package running on the computer (408) will use the data from the EFR (100) to enhance the user's enjoyment of the programming on the disc (106) and allow the user to better control the playback of that programming.

The EFR file (100) may be provided to the computer (408) in any of a number of ways. As illustrated in Fig. 4, the EFR file (100) may be transmitted to the computer (408) via the Internet (101) and connection (102). Alternatively, the EFR file (100) may be recorded on some medium readable by the computer (408). For example, the EFR file (100) may be recorded on a floppy disc (411) or CD-ROM (410) from which the EFR file (100) can be read into the computer (408).

Fig. 5 illustrates an alternative playback platform under the principles of the present invention. As shown in Fig. 5, the playback device for the optical disc (106) may be an intelligent video disc player (500). As used herein, the term "intelligent video disc player" refers to a playback device for reading video programming from an optical disc, which playback device operates under the control of a software package that accepts and utilizes an EFR file (100) to enhance the user's enjoyment and control of the playback of the programming on the disc (106).

The intelligent video disc player (500) shown in Fig. 5 includes a video disc drive (501) that can read video programming from a video disc and output that programming to a connected television set or monitor (550). The player (500) also preferably includes a user interface device (505), such as a keypad and display on the housing of the player (500), with which the user can control the player

(500). The user interface device (505) is preferably supplemented by a remote control unit (405) which communicates wirelessly with a transceiver (503) in the intelligent player (500).

The EFR file (100) may be delivered into the player (500) in any of a number of ways. Similar to the computer system described above in Fig. 4, the intelligent player (500) may have a connection (502) to an external network, such as the Internet or a cable television system. This connection (502) may be used to transmit an EFR file (100) to the player (500). Alternatively, the player (500) may include a disc drive (507) which can accept a floppy disc (411) or CD-ROM (410) bearing an EFR file (100). In yet another alternative, the video disc driver (501) may be able to read a CD or CD-ROM and may read an EFR file (100) from such a disc prior to accepting the optical disc (106) from which the corresponding video program is read.

Fig. 6 illustrates the important principle that the EFR file (100), generated on the system (108) illustrated in Fig. 1, can be accepted and used by a number of playback platforms (601). Examples of potential playback platforms (601) include, but are not limited to, a personal computer with a DVD drive, an Apple® computer, an intelligent DVD player, a Sony® Playstation2 or a Microsoft® Xbox.

Fig. 7 is a flowchart detailing the playback software package of the present invention that accepts and utilizes an EFR file (100). As noted above, this software package may be adapted to run on any playback platform with appropriate modification. This adaptation does not affect the package's ability to accept and utilize any EFR file (100). This is due, in the preferred embodiment, to the fact that the EFR file (100) is an XML file.

As shown in Fig. 7, the playback platform running the playback software package of the present invention (e.g., 408) will display a playlist using the data from the EFR (100). The playlist is a hierarchical listing of the divisions of the

video program illustrated in Fig. 3. Because this data is stored in the EFR (100), the playlist may be reviewed and edited with or without the corresponding optical disc (320).

Preferably, the playlist is displayed using a tree structure as shown in Fig. 7a. With the tree structure, the user can expand or close any branch of the hierarchy that the user wishes to see or work with. As shown in Fig. 7a, the user interface of the software package diagramed in Fig. 7 preferably displays the playlist (750) as a listing of divisions of the video program on the optical disc. Below each listed segment, an indented listing of the subdivisions of that segment can be accessed by selecting the icon (753, 754) associated with the listing for that segment.

As shown in Fig. 7a, the listing for the "Main Segment" has a "boxed minus" icon associated therewith. This indicates that the listing of subdivisions within the "Main Segment," i.e., the "Chapters," is displayed. The user could hide the listing of Chapters and subsequent subdivisions by selecting the "boxed minus" icon associated with the listing "Main Segment."

Similarly, the listing for Chap 1 includes a "boxed plus" icon (753), indicating that the subdivisions within Chap 1 are not presently listed in the playlist (750). These subdivisions of Chap 1 could be shown in an indented list under "Chap 1" if the user selects the "boxed plus" icon (753). In contrast, the icon (754) associated with the listing for Chap 2 is a "boxed minus" indicating that an indented listing of "Subscenes" within Chap 2 is displayed.

The playlist (750), if partially or wholly expanded to list the various subdivisions of the video program segments, may exceed the capacity of the monitor (751) on which the user interface is being displayed. Consequently, a scrolling mechanism for moving through the display playlist on the monitor will preferably be provided. Such mechanisms are well-known in the art and would be controlled through the user interface of the playback device.

The playlist (750) may also include a coding device that advises users when and what type of supplemental material is associated with the various subdivisions of the video program. In the example shown in Fig. 7a, each listing for a clip may include a number of differently colored dots (752). Each color of the dots (752) may represent a different type of supplemental information that is associated with that clip. For example, a red dot may be included with the listing for any clip for which there is a textual plot summary included in the EFR. A blue dot may be included with the listing for any clip in which there is potentially objectionable subject matter. A green dot may be included in the listing for any clip for which there is historical or cultural background information included in the EFR.

Any type of information associated with a clip may be designated by a particular color of dot or any other distinguishing character, symbol, icon, graphic, etc. Additionally, the coding system may be applied at any level of the hierarchy and not just at the "Clip" level. At any hierarchical level, the elements of the coding system (e.g. colored dots) may have associated therewith a number that gives an indication of how may subdivisions within that listing include supplemental data of that type or how much data of that type is included within those subdivisions.

Returning to Fig. 7, the playback platform running the playback software package of the present invention (e.g., 408) will display a playlist using the data from the EFR. (701). The user may then select a clip or other division of the hierarchy to work with (702). At the clip level, a menu or listing of the supplemental information associated with that clip will be displayed (703). The user may then explore the additional information associated with the clip (704). As noted above, the supplemental information may be of almost any type including, but not limited to, cultural notes, linguistic notes, plot summary, reviews and critiques, historical or other background notes, and a description of potentially objectionable subject matter. (705).

In addition to accessing the supplemental information, the user may also edit the playlist (706). In editing the playlist, the user may rearrange the order of segments or remove segments from the playlist so that those segments are skipped during playback of the video program. The user may also specify that some of the supplemental information contained in the EFR be displayed during playback to supplement or replace a corresponding video segment.

When the user has finished editing the playlist (707), the edited playlist is stored (711). If the user makes no edits to the playlist of the EFR (708) and then initiates playback of the unedited playlist (709), the entire video program is played (710) in the manner recorded on the optical disc. In other words, if the user does not edit the playlist and if the initial playlist is complete, a playback of the video program is the same as would be the case if the user had no ability to edit the playlist and were not using an EFR of the present invention.

It should also be noted that the user can edit the playlist and store an edited playlist using an EFR (100) of the present invention without having possession of the corresponding optical disc containing the video program. Portions of the video program itself, except perhaps single frames or quotations for indexing purposes, are preferably not included in the EFR (100).

If an edited playlist is produced and stored in the EFR (100), and the user then initiates playback (712) of the corresponding video program from an optical disc using the playback software package diagrammed in Fig. 7, the video program is played back subject to any changes in the sequence of segments or omission of segments dictated by the edited playlist (713). This may also include displaying a textual description of a segment or information regarding that segment included in the EFR (100) to supplement or replace the segment itself.

Consequently, the EFR and playlist of the present invention may be of great use to parents and educators who are displaying a video program for children or younger age groups and who may consequently wish to remove potentially

objectionable content from the playback. This gives the user great flexibility in deciding precisely what type of content in the video program is objectionable and allows the user to remove only that content. Moreover, the user need not experience the content he or she finds objectionable during editing, but can instead read a textual description of that content in the information associated with that clip or video segment in the EFR (100) of the present invention.

Fig. 8 illustrates an additional feature of the present invention. The EFR (100) may, in addition to the hierarchical divisions of the video program on a corresponding optical disc, also include a division of audio segments (310) within each clip. Each audio segment (310) will correspond to a word or phrase within the clip (307). The EFR (100) may contain a non-specific description of the language or a verbatim listing of the language in each audio segment (310). Consequently, any inappropriate word or phrase can be removed from the playlist as edited by the user.

Finally, Fig. 9 illustrates another feature of the playback software package of the present invention. As shown in Fig. 9, the user may initiate an analysis of an edited playlist (801). The analysis feature of the software will then provide an assessment of the edited playlist. The analysis may be on the edited playlist alone or on the edited playlist in comparison to the original unedited playlist (802).

Without a comparison to the original playlist, a number of important analyses can be performed on the edited playlist. For example, an indicator of the relevance of each video segment to the plot of the video program may be associated with that segment in the EFR (100) of the present invention. This indicator may be a numeric value or an alphanumeric code. Consequently, the analysis feature can assess and quantify damage done to the plot of the program by the removal of various video segments from the playlist. Additionally, the analysis feature may provide statistics on the edited playlist such as the amount of time required for playback. The analysis feature may also indicate the number of

segments remaining that include any one or all of the various types of supplemental information. For example, the analysis feature may indicate that a particular number of the included segments contain indications or descriptions of potentially objectionable subject matter and may divide that potentially objectionable subject matter in categories and degrees. These statistics are generated (806) and then displayed for the user (807).

If the user desires a comparison to the unedited playlist, the original playlist is retrieved (803) and analyzed in comparison with the edited playlist. For example, the amount of running time for each playlist, edited and unedited, may be compared. These statistics are generated (804) and then displayed for the user (805).

In another aspect of the present invention, if the user has deleted a clip or segment from the playlist, and that deleted segment has associated therewith an indicator of relevance to plot that is greater than a predetermined threshold, i.e., the deleted segment is highly relevant to the plot, the playback software package of the present invention may automatically display a textual description of the deleted segment in place of the segment to prevent the gap in plot that would otherwise occur in playback due to the deletion of the segment. Additionally, it should be understood that at any point in time during playback, using the playback software package of the present invention, the user can pause the playback and access the supplemental information associated with that or another segment of the video program.

Finally, using the playback software package of the present invention, the user may designate one or more types of supplemental information that are of particular interest in the purpose for which the user is playing back the video program. The playback software may then advise the user during playback when a particular segment of the video program has supplemental information of the designated type or types associated therewith. The user may then pause the

playback and access the information or instruct the playback software to automatically pause at such a point and display the relevant supplemental information.

This feature may also be tied to an indicator as to the significance of the supplemental information such that only supplemental information of the designated type which is coded as having a particular level of significance is advertised to the user during playback. This can minimize disruption to the playback if so desired by the user.

The preceding description has been presented only to illustrate and describe the invention. It is not intended to be exhaustive or to limit the invention to any precise form disclosed. Many modifications and variations are possible in light of the above teaching.

The terms "playback platform" are "video playback device" are used herein to refer generally to those devices, such as the computer (408) and intelligent video player (500), that run the playback software package of the present invention and control an optical disc drive to playback a recorded video program in accordance with an edited or unedited playlist of an EFR of the present invention.

The preferred embodiment was chosen and described in order to best explain the principles of the invention and its practical application. The preceding description is intended to enable others skilled in the art to best utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims.

WHAT IS CLAIMED IS:

1. A video playback system for playing back a video program recorded on a recording medium, the system comprising:

a video playback device; and

an recording medium reader for reading a recording medium on which said video program is recorded, said reader being controlled by said video playback device,

wherein said video playback device controls playback of said video program in accordance with a user-editable electronic data file existing in said video playback device independent of data recorded on said recording medium; and

wherein said electronic data file includes a user-editable playlist that divides said video program as recorded on said recording medium into at least one hierarchy of video segments.

2. The system of claim 1, wherein said electronic data file further comprises supplemental information associated with at least one of said segments of said video program.

3. The system of claim 2, wherein said supplemental information includes an alphanumeric code that rates a characteristic of said associated segment.

4. The system of claim 3, wherein said playback device generates a statistical analysis of characteristics of said video program as played back in accordance with said edited playlist based on said alphanumeric code.

5. The system of claim 2, wherein:

said system further comprises a user interface including a display device on which said playlist is displayed; and

said displayed playlist comprises a listing of said segments of said video program and a coding system that indicates what types of said supplemental information are associated with each said segment.

6. The system of claim 2, wherein said system further comprises a user interface, where said playback device accesses and displays said supplemental information under control of a user operating said user interface.

7. The system of claim 1, wherein said playback device further comprises a user interface and records changes to said playlist made by said user through said user interface.

8. The system of claim 7, wherein:

said electronic data file further comprises a description of each of a plurality of audio segments of said video program; and

said playback device records deletions of audio segments from said playlist made by said user through said user interface.

9. The system of claim 7, wherein said playback device generates a statistical analysis of characteristics of said video program as played back in accordance with said edited playlist.

10. A method of controlling and enhancing playback of a video program recorded on a recording medium, said method comprising controlling playback of said video program with a video playback device in accordance with a user-

editable electronic data file existing in said video playback device independent of data recorded on said recording medium, wherein said electronic data file includes a user-editable playlist that specifies a hierarchical division of segments of said video program as recorded on said recording medium.

11. The method of claim 10, further comprising enhancing playback of said video program by associating supplemental information in said electronic data file with at least one of said specified segments of said video program.

12. The method of claim 11, further comprising

displaying said playlist comprising a listing of said segments of said video program; and

displaying a coding system that indicates what types of said supplemental information are associated with each said segment.

13. The method of claim 11, further comprising accessing and displaying said supplemental information under control of a user operating a user interface of said video playback device.

14. The method of claim 10, further comprising recording an edited playlist in said electronic data file, said edited playlist including changes to said playlist made by said user through a user interface of said video playback device.

15. The method of claim 14, further comprising comparing said playlist to said edited playlist to assess an impact of said changes made to said playlist by said user.

16. The method of claim 14, further comprising analyzing said edited playlist to determine characteristics of said edited playlist.

17. A method of providing an electronic data file for use in controlling playback of a corresponding video program recorded on a recording medium, said method comprising:

dividing said video program as recorded on said recording medium into a hierarchy of segments; and

storing said hierarchy in an electronic data file independent of data recorded on said recording medium.

18. The method of claim 17, further comprising associating supplemental information with one or more of said segments, said supplemental information being recorded in said electronic data file.

19. A method of doing business in which customers are provided with a means for controlling and supplementing playback of a video program recorded on a recording medium, said method comprising selling an electronic data file that corresponds to said video program on said optical disc, wherein said electronic data file includes a user-editable playlist that divides said video program into video segments and includes supplemental information associated with one or more of said video segments, said data file being usable to control playback of said video program on a video playback device.

20. The method of claim 19, wherein said playlist divides said video program into a hierarchy of video segments.

21. The method of claim 19, further comprising delivering said electronic data file to a customer via the Internet.

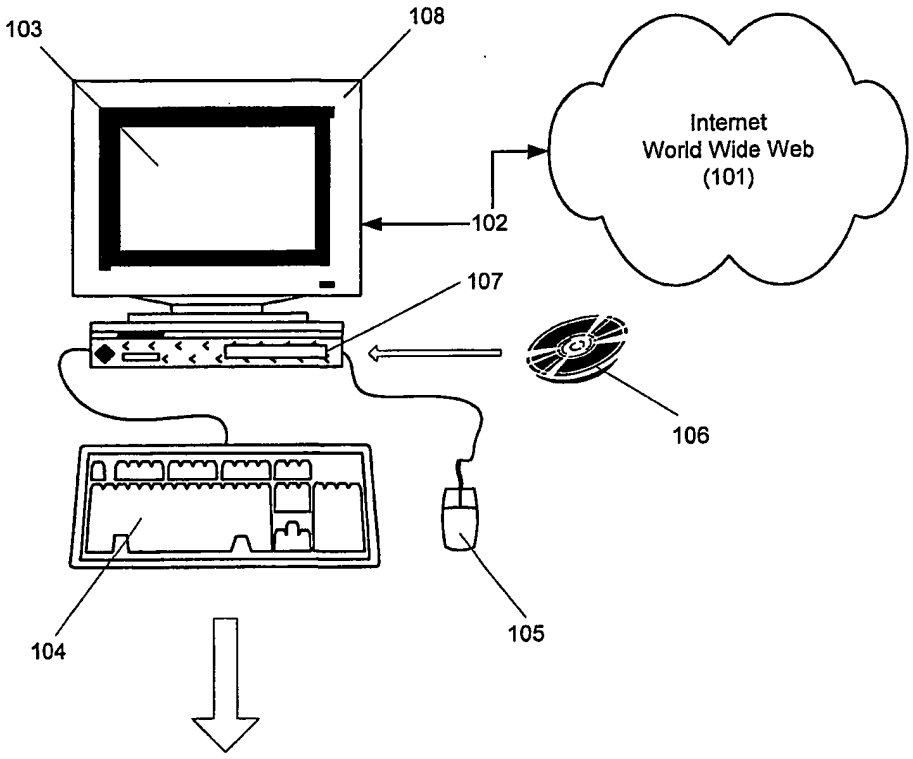


Fig. 1

EFR file
(100)

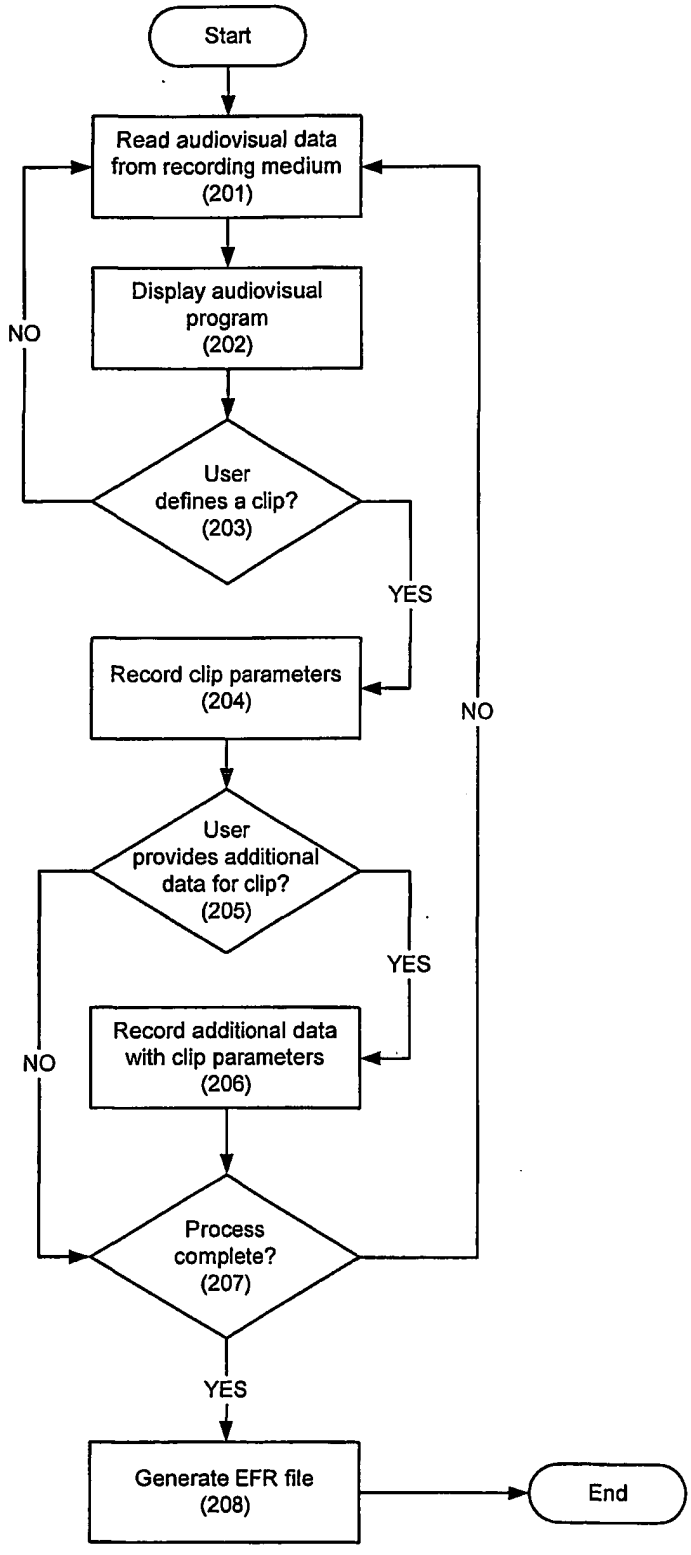

Start
Read audiovisual data from recording medium (201)
Display audiovisual program (202)
User defines a clip? (203)
NO
YES
Record clip parameters (204)
NO
User provides additional data for clip? (205)
YES
Record additional data with clip parameters (206)
NO
Process complete? (207)
YES
Generate EFR file (208)
End

Fig. 2

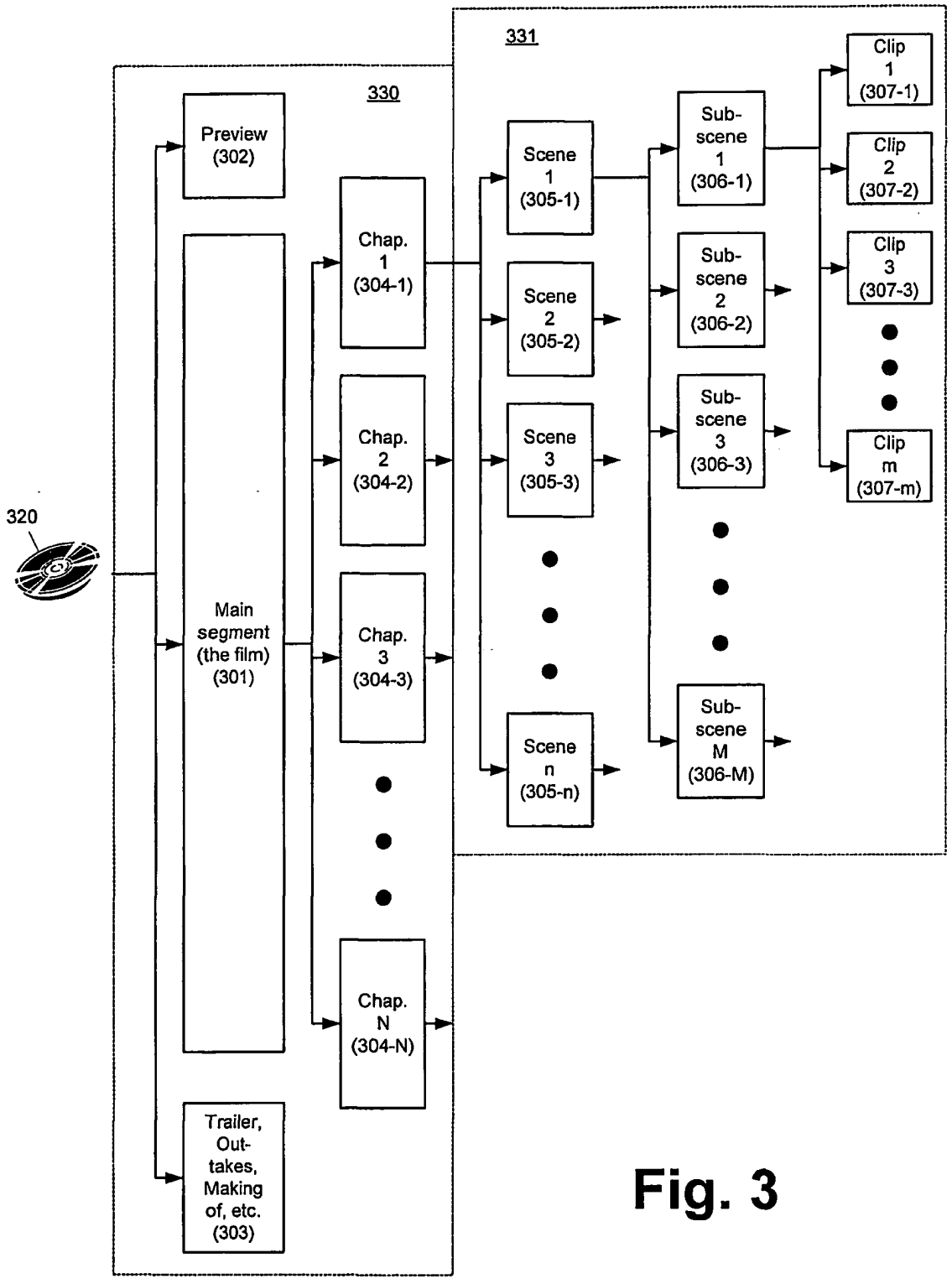

331
330
Preview (302)
Main segment (the film) (301)
Trailer, Out-takes, Making of, etc. (303)
320
Chap. 1 (304-1)
Chap. 2 (304-2)
Chap. 3 (304-3)
Chap. N (304-N)
Scene 1 (305-1)
Scene 2 (305-2)
Scene 3 (305-3)
Scene n (305-n)
Sub-scene 1 (306-1)
Sub-scene 2 (306-2)
Sub-scene 3 (306-3)
Sub-scene M (306-M)
Clip 1 (307-1)
Clip 2 (307-2)
Clip 3 (307-3)
Clip m (307-m)

Fig. 3

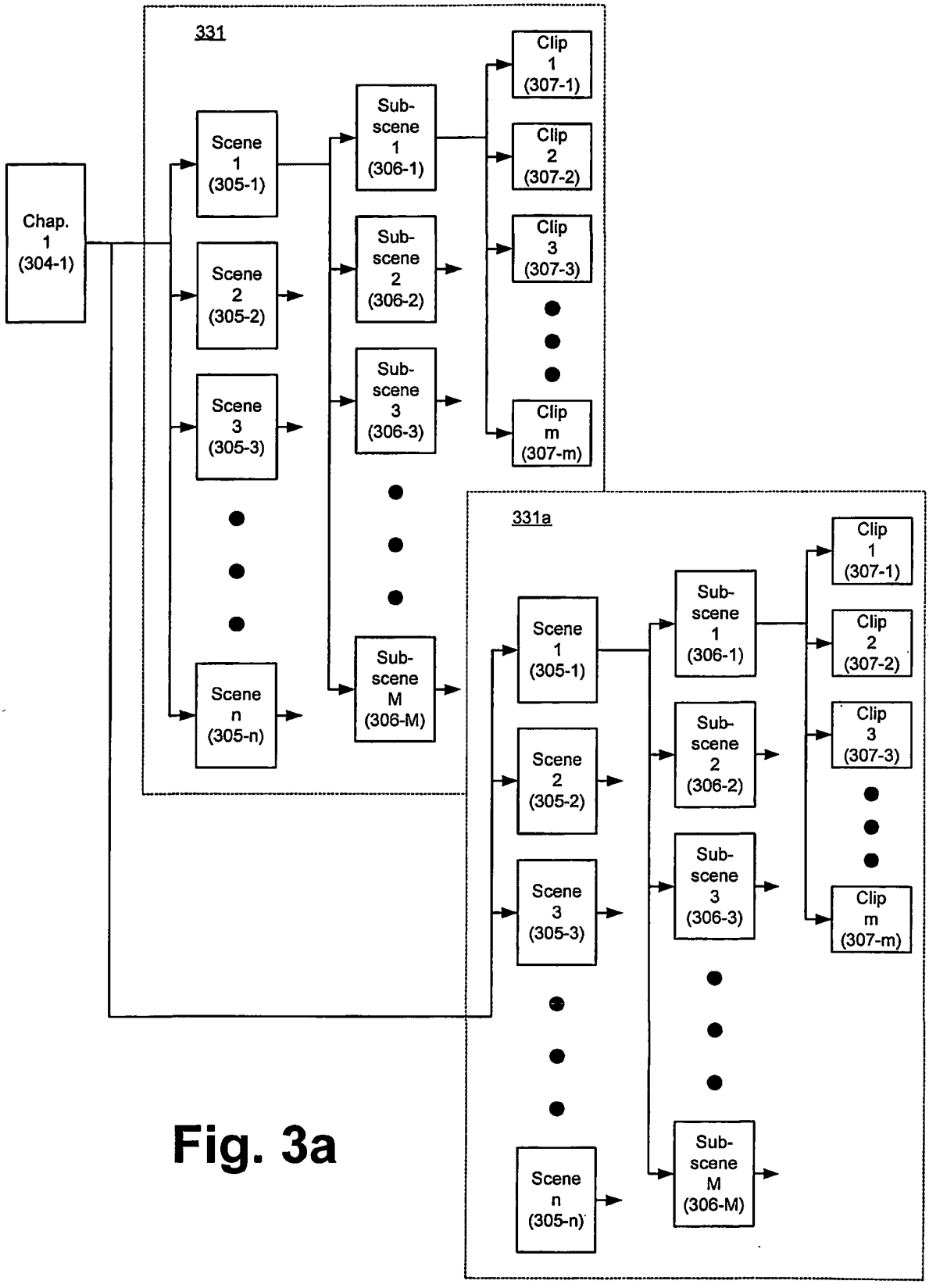

331
Chap. 1 (304-1)
Scene 1 (305-1)
Scene 2 (305-2)
Scene 3 (305-3)
Scene n (305-n)
Sub-scene 1 (306-1)
Sub-scene 2 (306-2)
Sub-scene 3 (306-3)
Sub-scene M (306-M)
Clip 1 (307-1)
Clip 2 (307-2)
Clip 3 (307-3)
Clip m (307-m)
331a
Scene 1 (305-1)
Scene 2 (305-2)
Scene 3 (305-3)
Scene n (305-n)
Sub-scene 1 (306-1)
Sub-scene 2 (306-2)
Sub-scene 3 (306-3)
Sub-scene M (306-M)
Clip 1 (307-1)
Clip 2 (307-2)
Clip 3 (307-3)
Clip m (307-m)

Fig. 3a

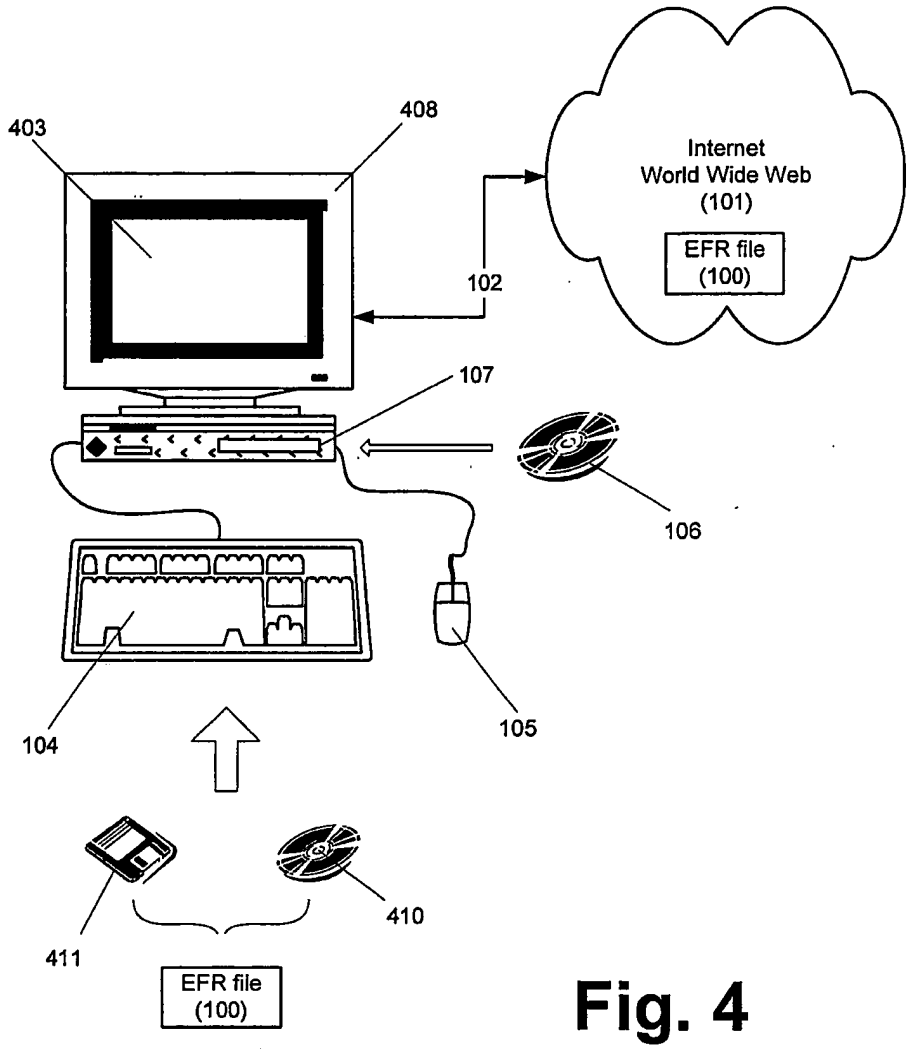

403
408
Internet
World Wide Web
(101)
EFR file
(100)
102
107
106
104
105
410
411
EFR file
(100)

Fig. 4

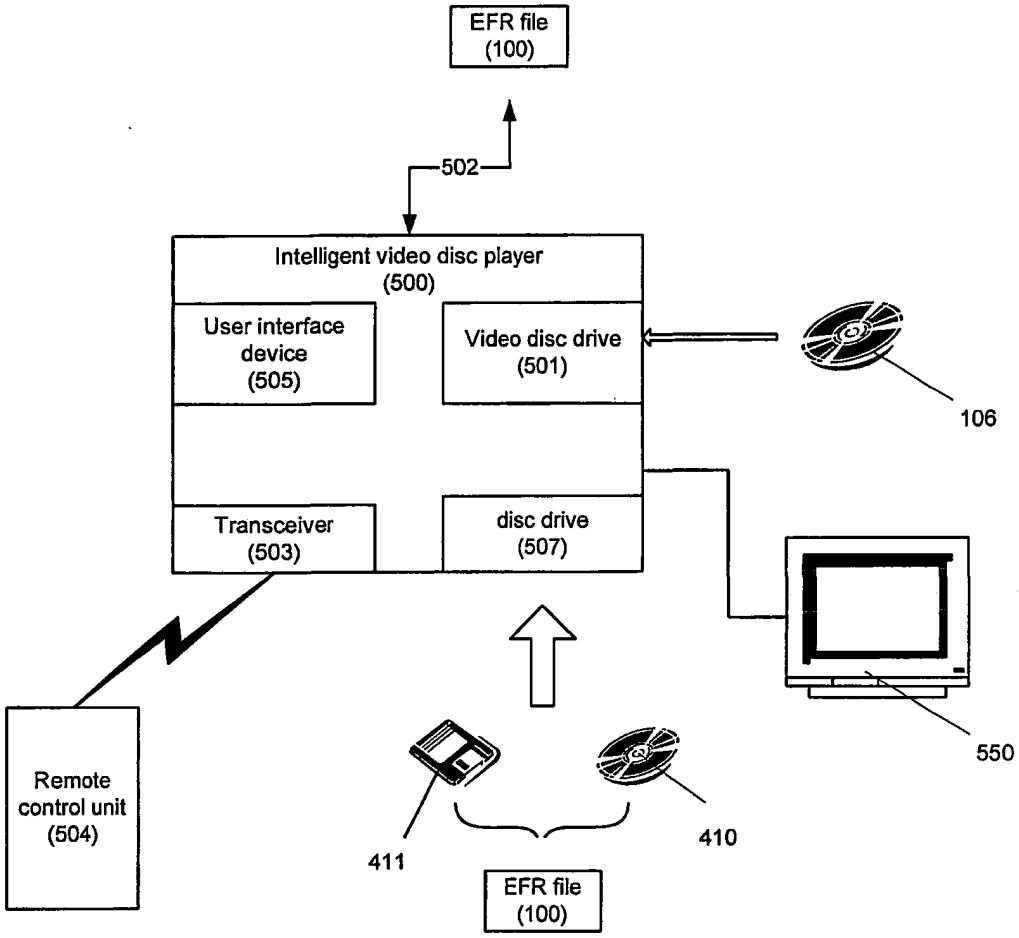

EFR file
(100)
502
Intelligent video disc player
(500)
User interface
device
(505)
Video disc drive
(501)
106
Transceiver
(503)
disc drive
(507)
550
Remote
control unit
(504)
411
410
EFR file
(100)

Fig. 5

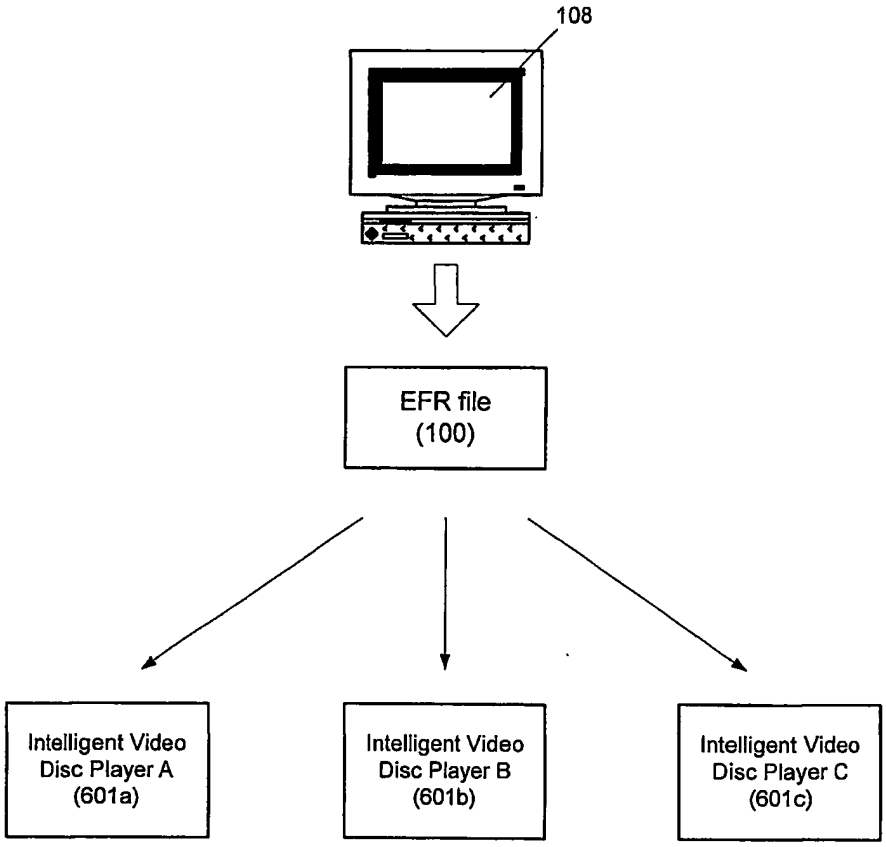
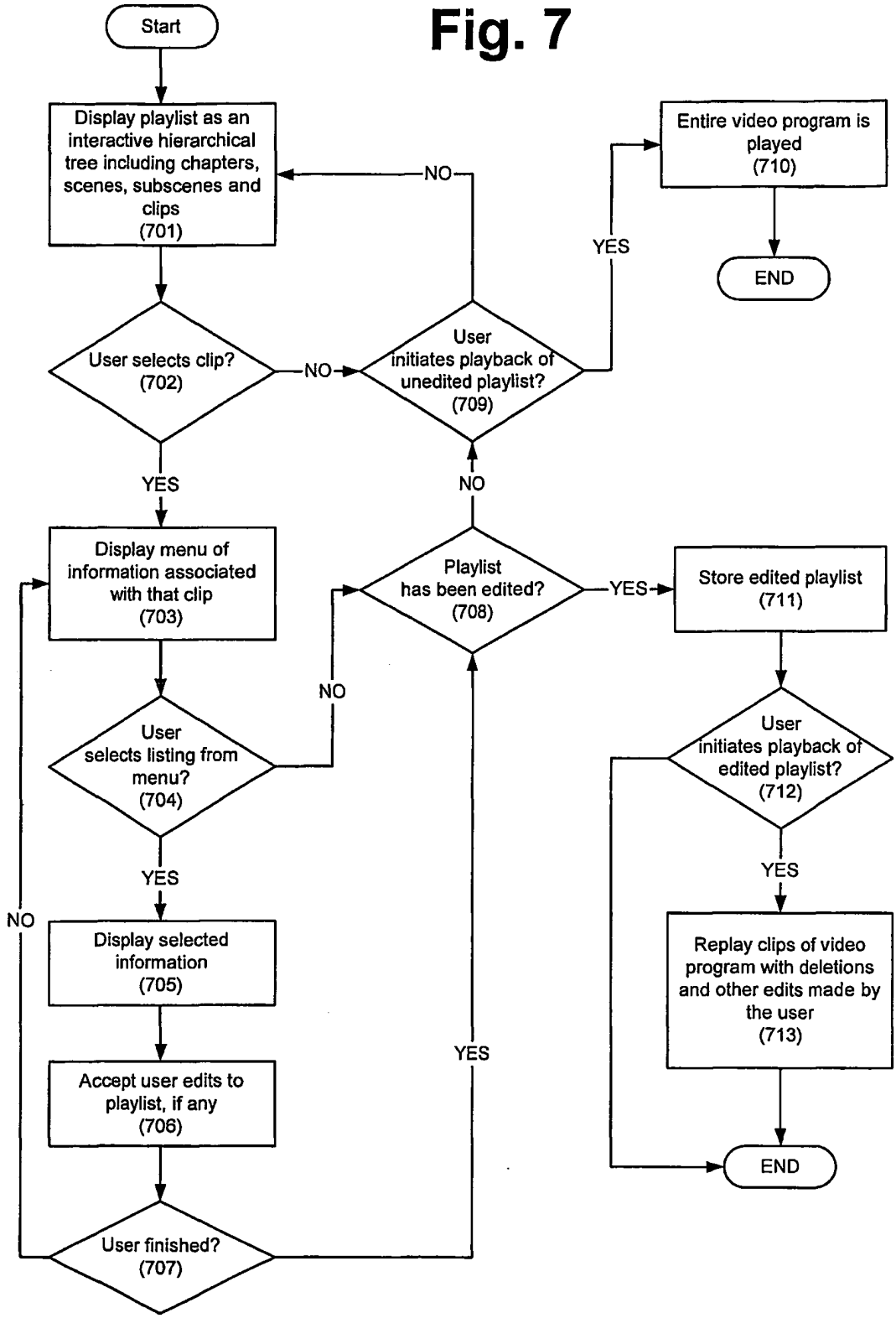

108
EFR file
(100)
Intelligent Video
Disc Player A
(601a)
Intelligent Video
Disc Player B
(601b)
Intelligent Video
Disc Player C
(601c)

Fig. 6

Fig. 7


Start
Display playlist as an interactive hierarchical tree including chapters, scenes, subscenes and clips (701)
User selects clip? (702)
NO
User initiates playback of unedited playlist? (709)
YES
Entire video program is played (710)
END
NO
YES
Display menu of information associated with that clip (703)
Playlist has been edited? (708)
YES
Store edited playlist (711)
NO
User selects listing from menu? (704)
NO
User initiates playback of edited playlist? (712)
YES
YES
Display selected information (705)
Replay clips of video program with deletions and other edits made by the user (713)
Accept user edits to playlist, if any (706)
YES
END
User finished? (707)
NO

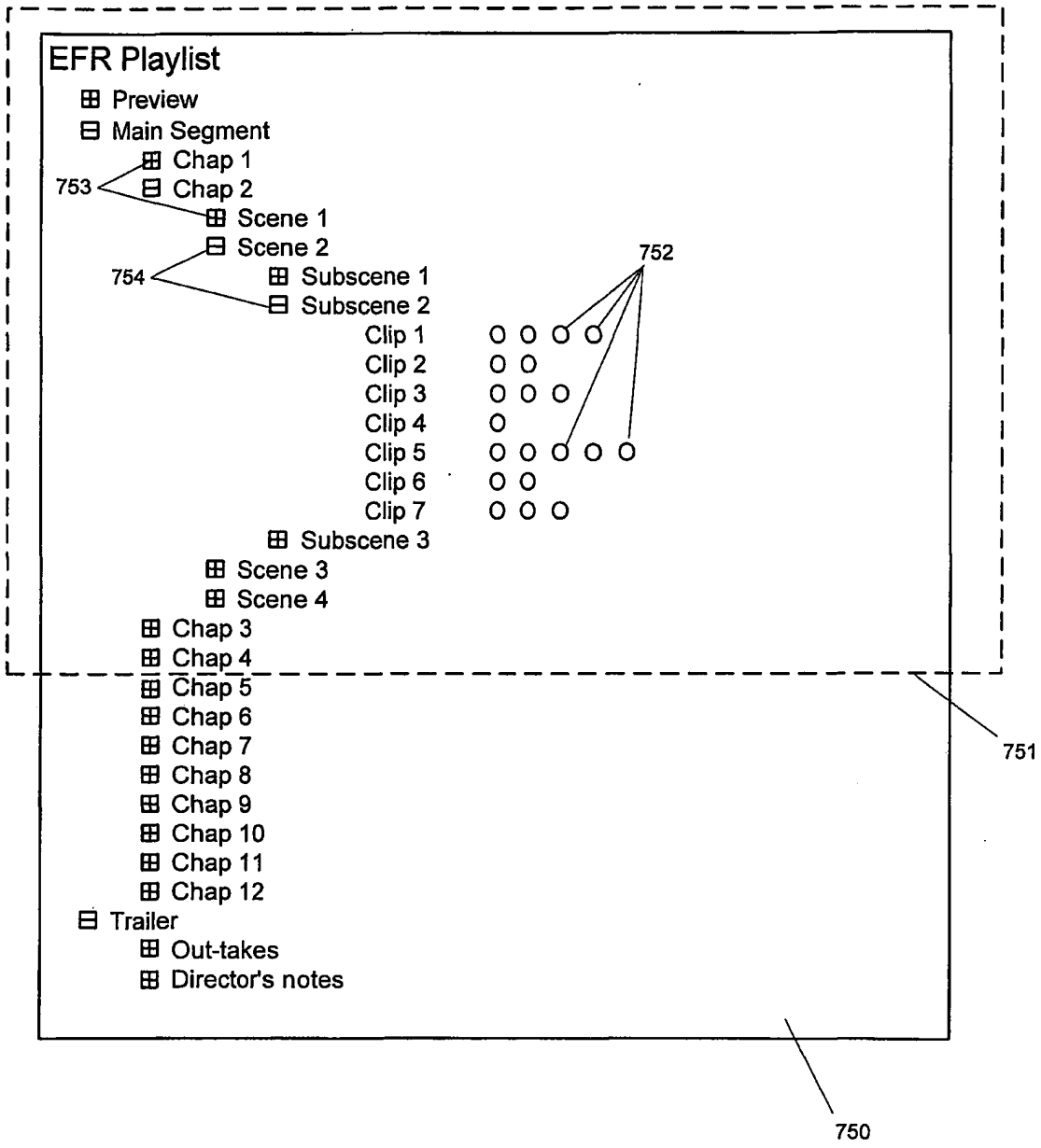
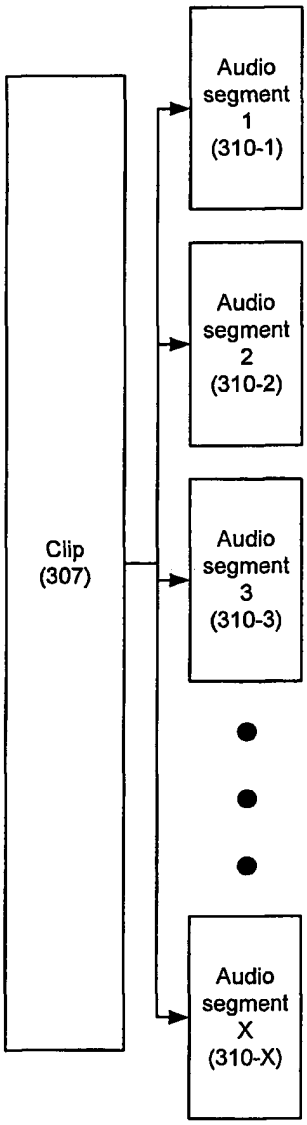

EFR Playlist
Preview
Main Segment
Chap 1
Chap 2
Scene 1
Scene 2
Subscene 1
Subscene 2
Clip 1
Clip 2
Clip 3
Clip 4
Clip 5
Clip 6
Clip 7
Subscene 3
Scene 3
Scene 4
Chap 3
Chap 4
Chap 5
Chap 6
Chap 7
Chap 8
Chap 9
Chap 10
Chap 11
Chap 12
Trailer
Out-takes
Director's notes
753
754
752
751
750

Fig. 7a

Fig. 8


Clip
(307)
Audio segment 1 (310-1)
Audio segment 2 (310-2)
Audio segment 3 (310-3)
Audio segment X (310-X)

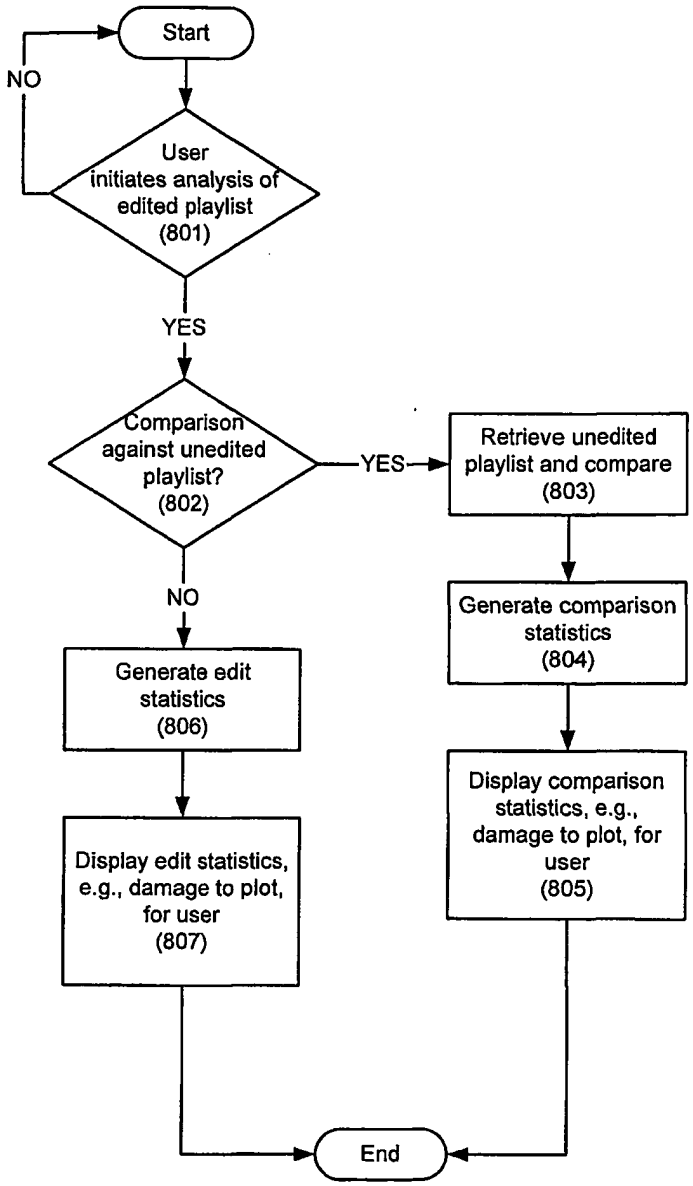

Start
NO
User initiates analysis of edited playlist (801)
YES
Comparison against unedited playlist? (802)
YES
Retrieve unedited playlist and compare (803)
Generate comparison statistics (804)
Display comparison statistics, e.g., damage to plot, for user (805)
NO
Generate edit statistics (806)
Display edit statistics, e.g., damage to plot, for user (807)
End

Fig. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/47062

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : H04N/593
US CL : 386/55
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 386/55, 70, 75

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	US 6,289,165 B1 (ABECASSIS) 11 September 2001 (11.09.2001), figure 6A; figure 7A; column 2, lines 46-52; column 16, lines 1-3; column 12, line 32; column 15, lines 63-65; column 16, lines 28-39; column 20, lines 4-16; column 21, lines 3-19; column 24, lines 26-36; column 28, lines 1-2; column 39, lines 21-25.	1-21

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 May 2002 (30.05.2002)	27 JUN 2002
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Andrew Christensen Telephone No. (703)305-3900

Form PCT/ISA/210 (second sheet) (July 1998)